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burn them, and thus create gas, are furnished by Schering & Glatz of New York. H. K. Mulford Co. have also devised a regenerator which converts formaldehyde solution into gas in large quantities so that the work of disinfecting public institutions, like schoolrooms and hospital wards, can be done quickly and in a thoroughly satisfactorilly manner. The work of disinfection should always be under the direction of a physician or some other scientific person who knows how strong the disinfectant must be in order to surely destroy all of the disease germs. Some skill is also required in order to properly expose carpets, upholstered furniture, books papers, bedding and wearing apparel so that the disinfecting gas may thoroughly penetrate every part of the thing which requires disinfection.

TREES AND SHRUBS OF HAMILTON COUNTY.

H. A. MUELLER.

Hamilton county is the fourth from the north and the sixth county from the Missouri river, thus placing it in the north central portion of Iowa.

The county is a distinctly prairie country, situated on a level divide between the Des Moines river on the west and Iowa river on the east, neither stream touching the borders of the county.

The general surface of the county is quite level, dotted here and there with small lakes and ponds. Of late, these depressions have been drained and converted into valuable farm land. The only streams of any note within the borders of the county are Boone river in the western and Skunk river in the southeastern part. The latter stream has its source near the east central portion, flows south, crossing the south line about six miles from the southeast corner. Skunk river has cut a narrow, shallow channel through the Wisconsin drift plain, and there are no banks worth mentioning. The timber along this stream is limited to an area about ten miles long and about one-fourth mile wide.

The only hills of any importance in the county are found along the Boone river. This stream enters the county about

four miles from the northwest corner, flows south and southwest, crossing the west line about seven miles from the southwest corner, where it soon empties into the Des Moines river. White Fox creek is the only tributary of any size.

Boone river has cut quite a deep channel below the general surface and the bluffs are quite precipitous. The bottoms are very narrow, and in many places the river has cut through the land, leaving quite steep banks on either side. At the top of the bluffs the general surface plain begins and continues until another stream is reached.

This portion of Iowa was invaded by the Wisconsin glacier, so the topography of the country is, geologically speaking, quite young. The soil is a dark rich loam, somewhat sandy in many localities. Below it is the Wisconsin drift, a yellowish till varying from five to twenty feet in thickness. The Wisconsin drift is well exposed along the bluffs of Boone river. From Jewell Junction to Blairsburg and northward there is a chain of low hills known as the moraines of the Wisconsin glaciers. Below the Wisconsin drift are beds of sand and gravel which may probably be correlated with the "Buchanan gravels." The Kansan drift is well exposed at Webster City, varying from five to ten feet. It rests upon a sandstone of the St. Louis stage. In the south part of Webster City, on Brewer creek, there are three quarries from which a considerable amount of quite serviceable building stone are taken, both sandstone and limestone. Beds of the latter are below and occur in heavy ledges. Farther south in Webster township the upper Carboniferous is exposed. Some cannel coal is mined in that locality.

It is along Boone river that the forest of Hamilton county is found. The timber area covers a territory of about twenty-five miles long and varies from one-half to three miles in width.

The native forest consisted of some very valuable timber, but little of it remains standing with the exception of some tracts that have been reserved. From these groves an observer may form an idea of the extent and value of the original forest, that greeted the early pioneer. It was along the timber that our civilization and early colonization began, for upon it the early settler depended for the material to build a home, the rails to protect his crops, and fuel for his fireplace.

The timber, at present, is practically of a second growth with the exception of some large trees that were not fit for the

sawmill. The principal use of the forest at the present day is for fence posts and fuel. Dry wood sells in Webster City for from $3.50 to $4.50 per cord.

The trees most conspicuous along the banks of the streams are the willow, soft maple, white elm, and cottonwood; farther away are the box elder, black walnut, hard maple, white and black ash. On the upland there are the bur and red oak, shell bark and bitternut hickory, red elm and quaking asp. The following list of about fifty species were found principally about Webster City:

List of the shrubs and forest trees found growing in Hamilton county:

TILIACEÆ.

Tilia americana L. Basswood. Linden. Quite common along the banks of ravines.

RUTACEÆ.

Xanthoxylum americanum Mill. Prickly ash. Frequent in the woods.

CELASTRACEÆ.

Celastrus scandens L. Climbing bittersweet. Found on upland climbing over small trees or shrubs.

VITACEÆ.

Vitis viparia Michx. Wild grape. Very common on low rich soil.

Ampelopsis quinquefolia Michx. Virginia creeper. Not rare.

SAPINDACEÆ.

Acer dasycarpum Ehrh. Soft maple. Very common along the banks of streams. Much planted for groves.

Acer saccharinum L. 1753. White maple. Very common along the banks of streams. Much planted for groves.

Acer saccharinum Wang. 1787. Sugar, or rock maple. Common on second bottom and hillsides.

Acer barbatum Mx. 1803. Sugar, or rock maple. Common on second bottom and hillsides.

Negundo aceroides Moench. Box elder. Common along all streams and low bottoms. Much used for shade trees.

ANACARDIACEÆ.

Rhus glabra L. Smooth sumach. Common in thickets along the bluffs, or on the upland.

Rhus toxicodendron L. Poison ivy. Rich soil.

LEGUMINOSÆ.

Robinia pseudacacia L. Common, or black locust. Not common.

Gymnocladus canadensis Lam. Kentucky coffee tree. Rare.

Gleditschia triacanthos L. Honey locust. Quite frequent.

ROSACEÆ.

Prunus americana Marshall. Wild plum. Very common in clumps on rich soil. It also grows on upland among the hazel.

Prunus serotina Ehrh. Wild black cherry. Quite common.

Prunus virginiana L. Choke cherry. Common in thickets on low land.

Rubus strigosus Michx. Wild red raspberry.

Rubus occidentalis L. Black raspberry.

Rubus villosus Ait. Common blackberry.

Rosa blanda Ait. Wild rose. Common.

Pyrus coronaria L. Crab apple. Common on low ground.

Crataegus coccinea L. Hawthorn. Red haw.

Crataegus coccinea var. *mollis* Torr. and Gray. The two species above are quite common on the bottoms and along ravines.

Amelanchier canadensis Torr. and Gray. Service berry. Juneberry. Common along banks of ravines.

SAXIFRAGACEÆ.

Ribes oxyacanthoides L. Common wild gooseberry.

HAMAMELIDÆ.

Hamamelis virginiana L. Witchhazel. Very common. Found on upland growing among the hazel thickets.

CORNACEÆ.

Cornus stolonifera Michx. Red osier dogwood.

Cornus paniculata L'Her. Panicled cornel. Common dogwood. Common.

CAPRIFOLIACEÆ.

Sambucus canadensis L. Blackberried elder. Common on rich soil.

Viburnum prunifolium L. Black haw. Quite common on low, rich ground.

OLEACEÆ.

Fraxinus americana L. White Ash. Very common. North of Webster City a tree was found three feet in diameter and seventy-five feet high.

Fraxinus sambucifolia Lam. Black ash. Common on low bottom land. Trees were found sixty feet high and eighteen inches in diameter.

URTICACEÆ.

Ulmus fulva Michx. Slippery or red elm. Common in upland woods.

Ulmus americana L. White, or American elm. Very common on banks of streams and low lands. Planted for shade and street trees.

Ulmus racemosa Thomas. Rock or cork elm. Rare. River bottom.

Celtis occidentalis L. Hackberry. Quite common along the river bottoms.

JUGLANDACEÆ.

Juglans cinerea L. Butternut. White walnut. Common on bottoms and upland.

Juglans nigra L. Black walnut. Very common along the rich river bottoms. The most valuable trees have been cut and shipped to the east.

Carya alba Nutt. Shell bark hickory. Common in upland woods.

Carya amara Nutt. Bitternut. Very common on hillsides and upland.

CUPULIFERÆ.

Corylus americana Walt. Hazelnut. Very common in open woods and along the border of the prairies.

Ostrya virginica Willd. Ironwood. Common along the small streams.

Quercus alba L. White oak. Not common. Found on high clay points.

Quercus macrocarpa Michx. Bur oak. Very common everywhere, most abundant on upland. A valuable tree for fence posts.

Quercus rubra L. Red oak. The most abundant of the black oak species. Found on upland in connection with the hickory and bur oak.

Quercus coccinea var. *tinctoria* Wang. Black oak. Not common.

SALICACEÆ.

Salix nigra Marsh. Black willow. Very abundant along banks of the streams.

Salix discolor Muhl. Pussy willow.

Populus tremuloides Michx. American aspen. Very common on low damp soil. This is one of the most conspicuous trees on the upland, growing along the edges of wet places.

Populus monilifera Ait. Cottonwood. Common on rich soils along the banks of streams and in low places.

GYMNOSPERMÆ.

CONIFERÆ.

Juniperus virginiana L. Red cedar. Quite common, found growing among the trees on the upland. They are transplanted before the trees become any size.